

Clinical Outcome, Speed, And Agility of Patients After Anterior Cruciate Ligament Reconstruction

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ABSTRACT

The anterior cruciate ligament (ACL) is the most often torn of the knee ligaments, with 68.6 rips per 100,000 person-years. Due to knee instability, arthroscopic ACL restoration is still the gold standard surgical treatment, especially for patients who cannot participate in sports requiring jumping and cutting motions. This study attempted to examine clinical outcomes, speed, and agility in children with Down syndrome following eight months of physiotherapy. The participants in Group I and II were matched for age, gender, and BMI. Adults with post-traumatic ACL reconstruction were assigned to Groups I and II. The mean period between injury and reconstruction in Group I was 31.0027.70 weeks, whereas in Group II it was 32.0050.15 weeks. The arthroscopist performed primary unilateral single-bundle ACL repair using an autologous ipsilateral hamstring graft on all patients in Groups I and II. It was performed by the same two senior surgeons who performed the original procedures. The patients' speed and agility returned to normal after 8 months of postoperative rehabilitation. Results of the speed and direction change run tests were associated with postoperative physiotherapy monitoring. The longer postoperative physiotherapy treatment, the shorter test time and faster average speed. The period of postoperative physiotherapy monitoring has little effect on the clinical outcome of males 8 months following ACL surgery. Both physiotherapy methods worked well in these areas. The longer postoperative physiotherapy supervision helped men 8 months after ACL surgery develop normal speed and agility.

Keywords: Physiotherapy, rehabilitation, knee replacement, run speed test.

Introduction:

This is the most common injury to the knee ligaments, with an injury rate of 68.6 per 100,000 person-years [1, 2]. [3, 4] Because of the knee's instability, arthroscopically assisted ACL restoration is still the best way to fix it, especially for people who can't play sports that require jumping or cutting because of their knee instability.

Gait is one of the most basic and efficient ways for humans to move around. It's when the body's mass centre moves down a track with as little energy use as possible. If you move your lower body with a motive, cyclic, and alternate movement, your upper body moves in a different way, and vice versa. Each side of the body should move about the same amount of time and space, and this is especially true for people who are lateralized on the right and left [5, 6]. This type of movement is controlled by a complex network of neural pathways that run through many parts of the nervous system. It is also very precise in terms of neuromuscular synchronisation and coordination. A lot of people have written about gestural

analysis [7, 8]. As of 2005, there were more than 6,500 articles and textbooks on gait analysis [9, 10].

Aim of the study:

This study sought to determine characteristics of clinical result, speed, and agility after eight months of participation in a physiotherapeutic programme for children with Down syndrome.

Materials & methods:

Matching participants in Group I and Group II was done in terms of the length of time since ACL repair, general health condition, type of graft used for reconstruction, lack of extra surgeries during the reconstruction and absence of any abnormalities in the contralateral knee. ACL repair time, general health, kind of graft used, and the absence of extra surgeries during the reconstruction were all matched between participants in Group I and Group II (BMI). Group III participants were matched based on a variety of factors, including their age, gender, height, weight, level of physical activity, and body mass index (BMI) (healthy controls).

A total of 12 patients who underwent primary unilateral intra-articular reconstruction in the study's physiotherapy centre during the trial's duration were invited to participate in the subsequent study at an average of 8 months after surgery.

Results & Discussion:

Groups I and II of the study enrolled adults who had had post-traumatic ACL rehabilitation. The mean period between injury and reconstruction was 31.0027.70 weeks in Group I and 32.0050.15 weeks in Group II. Under the guidance of an arthroscopist, all members of Groups I and II underwent initial unilateral single-bundle ACL repair with an autologous ipsilateral hamstring graft. Reconstructions were performed by the two senior surgeons who performed the initial procedures.

During reconstruction, the ST (semitendinosus) and GR (gracilis) tendons were collected using a tendon stripper and a 25–30mm oblique incision above the pes anserinus.

The tendons were prepared using hamstring autografts with a four-stranded double-loop structure. The ACL tibial guide was positioned at a 45° angle from the medial tibial cortex to the centre of the footprints in order to construct the tibial tunnel to the diameter of the harvested tendon. An anteromedial portal was used to create a femoral tunnel, which was then positioned on the posterior side of the notch at a 10:30 orientation for the right knee joint and a 1:30 orientation for the left knee joint. It was then introduced through the tibial tube into the femoral tunnel and attached using an EndoButton to the laterally protruding femoral cortex.

Clinical Observation of a patient:

Based on Lachman and anterior drawer tests, no anomalies were found in either of the study groups. All of the people who took part in the research experienced a downward pivot. Group I and II participants in the pain assessment did not report any daily pain in the afflicted limb.

TABLE 1: Circumference and range of motion values are compared between groups.

	Studied limb	Group I	Group II	Studied limb	Group III	P-Value
Knee joint circumference (cm)	Involved	35.33 (34.17, 36.50)	35.11 (34.06, 37.11)	Right	33.11 (34.39, 35.44)	0.331
	Uninvolved	35.14 (33.11, 34.20)	35.63 (34.14, 35.53)	Left	35.10 (34.46, 35.60)	0.165
	<i>P</i>	0.143	0.031	0.777		
Thigh circumference (cm)	Involved	44.70 (44.13, 45.47)	44.50 (43.04, 47.26)	Right	45.63 (44.73, 46.64)	0.871
	Uninvolved	46.55 (44.34, 48.79)	46.51 (45.10, 47.15)	Left	45.60 (43.47, 46.51)	0.343
	<i>p</i>	0.031	0.007	0.721		
Knee joint extension (°)	Involved	-1.27 (-1.43, -0.35)	-0.06 (-1.16, 1.12)	Right	-0.60 (-0.41, 0.10)	0.153
	Uninvolved	-1.70 (-2.21, -0.25)	-1.00 (-2.36, 1.37)	Left	-0.59 (1.41, 0.11)	0.478
	<i>p</i>	0.711	0.111	Not applicable		
Knee joint flexion (°)	Involved	127.00 (113.76, 116.47)	121.70 (118.74, 117.32)	Right	131.65 (123.87, 130.35)	≤0.001
	Uninvolved	121.11 (113.17, 116.47)	121.43 (120.91, 117.32)	Left	136.54 (130.9, 130.35)	≤0.001

		124.57)	125.12)		150.45)	
	p	0.121	0.004	0.921		

Both thigh and knee joint circumferences and knee extension were not significantly different between the two groups (Table 1). Group III's knee flexion was substantially better than that of Group I's and Group II's

affected knees ($p=0.023$ and $p\leq 0.001$). Additionally, there were significant differences between Group I and Group II in terms of the limbs involved ($p=0.041$).

TABLE 2: Run test results with maximum speed and direction change inter-group comparisons

	Time (S)	Distance (m)	Average speed ($m*s^{-1}$)
Group I	20.44 (19.37, 21.72)	46.00 (n/a)	2.19 (2.10, 2.14)
Group II	22.57 (20.74, 24.39)	46.00 (n/a)	1.95 (1.87, 1.15)
Group III	2.05 (1.92, 2.18)	46.00 (n/a)	2.22 (2.11, 2.34)
P	0.001	Not applicable	0.001

Uninvolved knee flexion in the Group II compared to Group III and Group I was substantially worse in the Group II ($p\leq 0.001$) and Group I ($p=0.016$). Between Group I and Group III, there were no significant differences in the uninvolved limbs ($p=0.187$). The clinical significance of these changes, on the other hand, is still debatable.

In terms of knee joint stability, thigh and knee joint circumferences, active range of motion, and day-to-day discomfort, postoperative physiotherapy monitoring had no effect on the clinical results of ACL reconstruction patients. Both physiotherapy approaches were effective in addressing these issues. Although patients' speed and agility returned to healthy levels after only eight months of postoperative rehabilitation, this is not universal. The outcomes of the speed and direction change run tests were linked to the length of postoperative physiotherapy monitoring. The shorter the testing period and the higher the average speed, the more time spent in postoperative physiotherapy treatment.

Conclusion:

The period of postoperative physiotherapy monitoring had no effect on the clinical prognosis of men 8 months after ACL repair in terms of knee joint stability, thigh and knee joint circumferences, active range of motion, and daily discomfort. In these areas, both physiotherapy treatments were beneficial. The longer postoperative physiotherapy supervision was more beneficial in males 8 months after

ACL surgery for restoring speed and agility to healthy levels.

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